

Variants of SARS-CoV-2

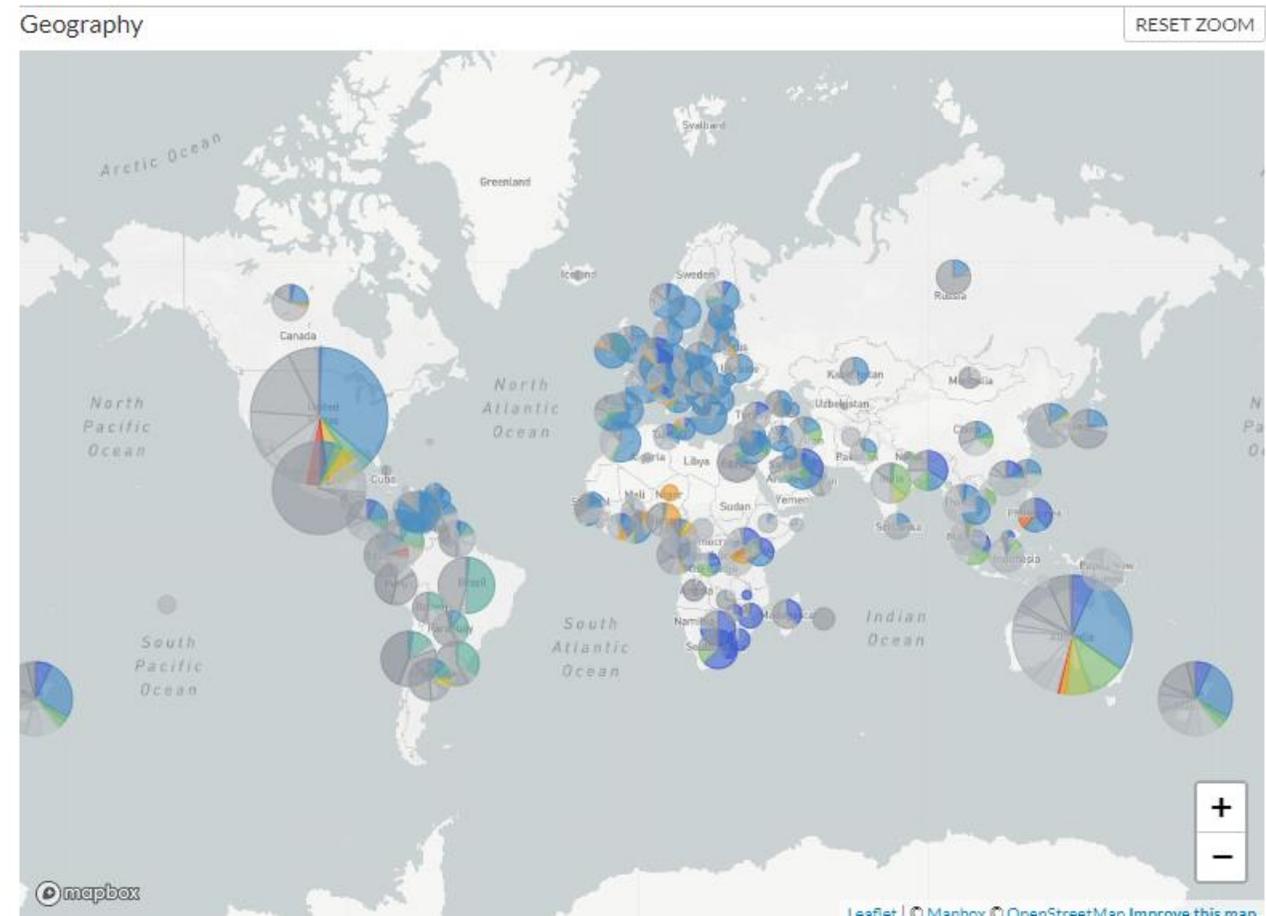
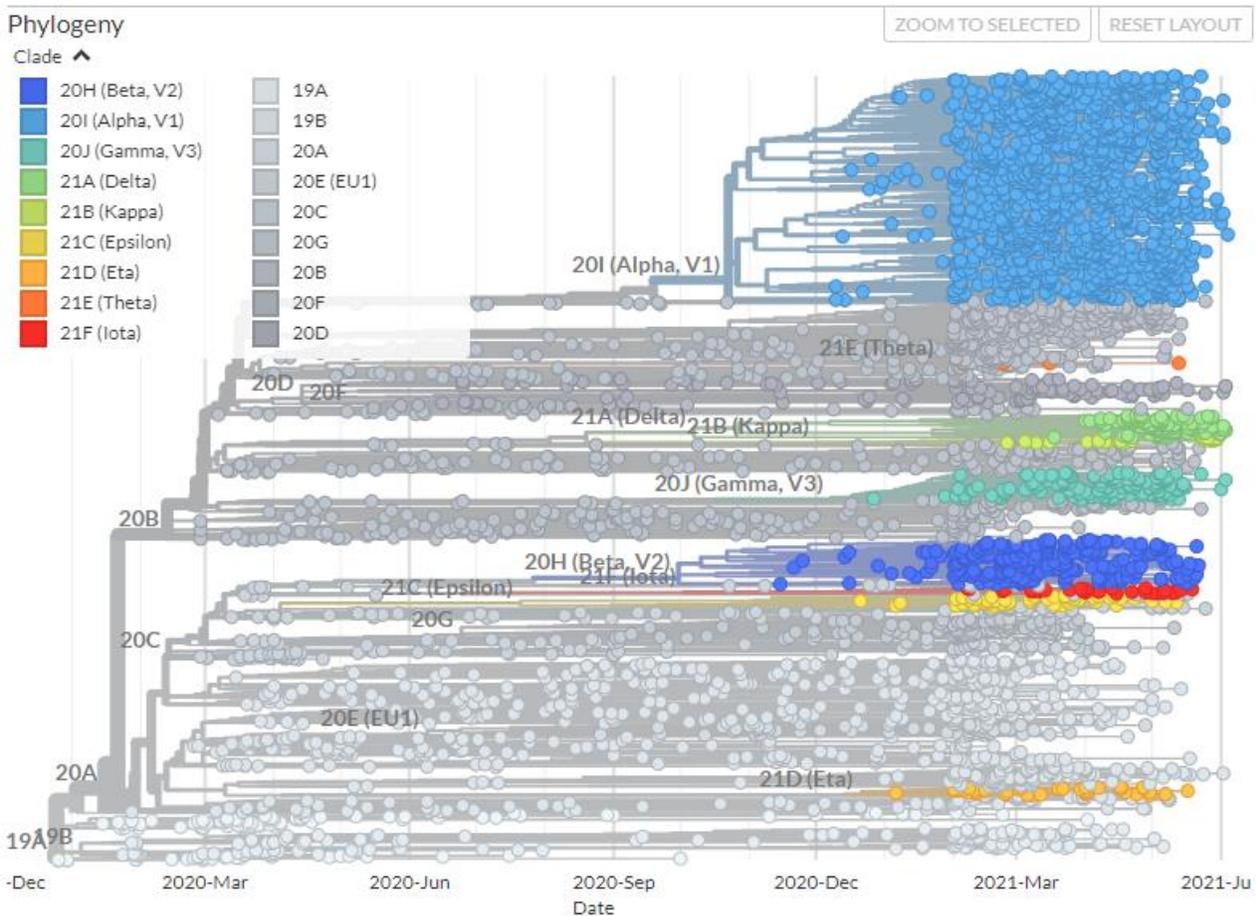
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Chicago Department of Public Health

★ There are many, many variants of SARS-CoV-2

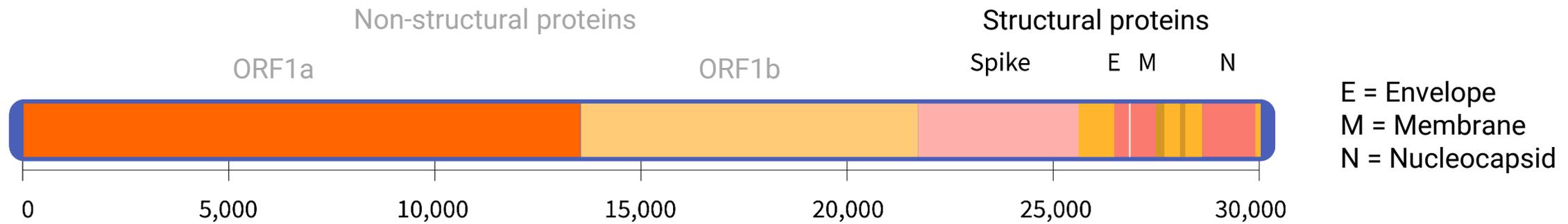
Genomic epidemiology of novel coronavirus - Global subsampling

Built with nextstrain/ncov. Maintained by the Nextstrain team. Enabled by data from [GISAID](#).

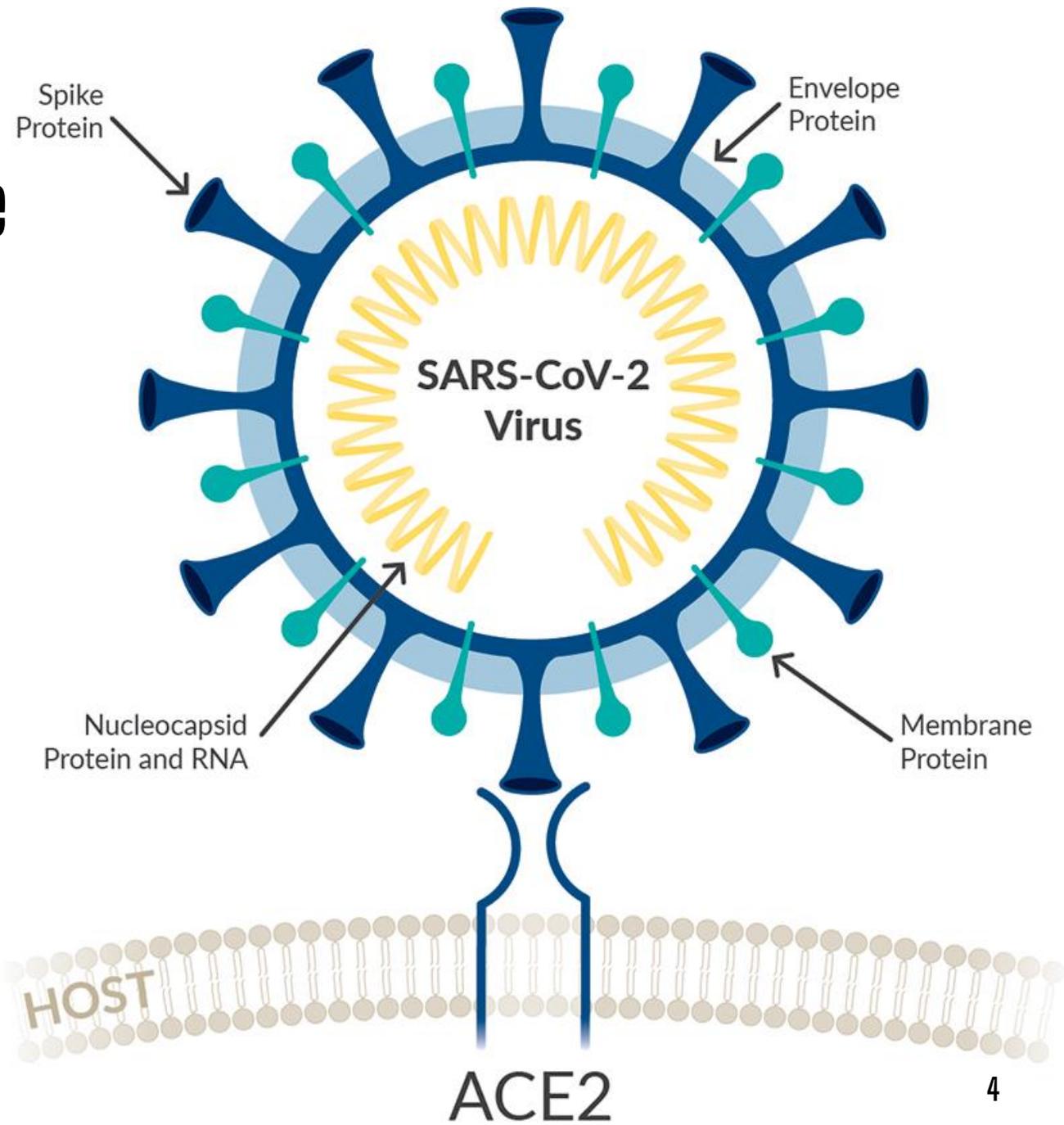
Showing 4001 of 4001 genomes sampled between Dec 2019 and Jun 2021.



The SARS-CoV-2 Genome

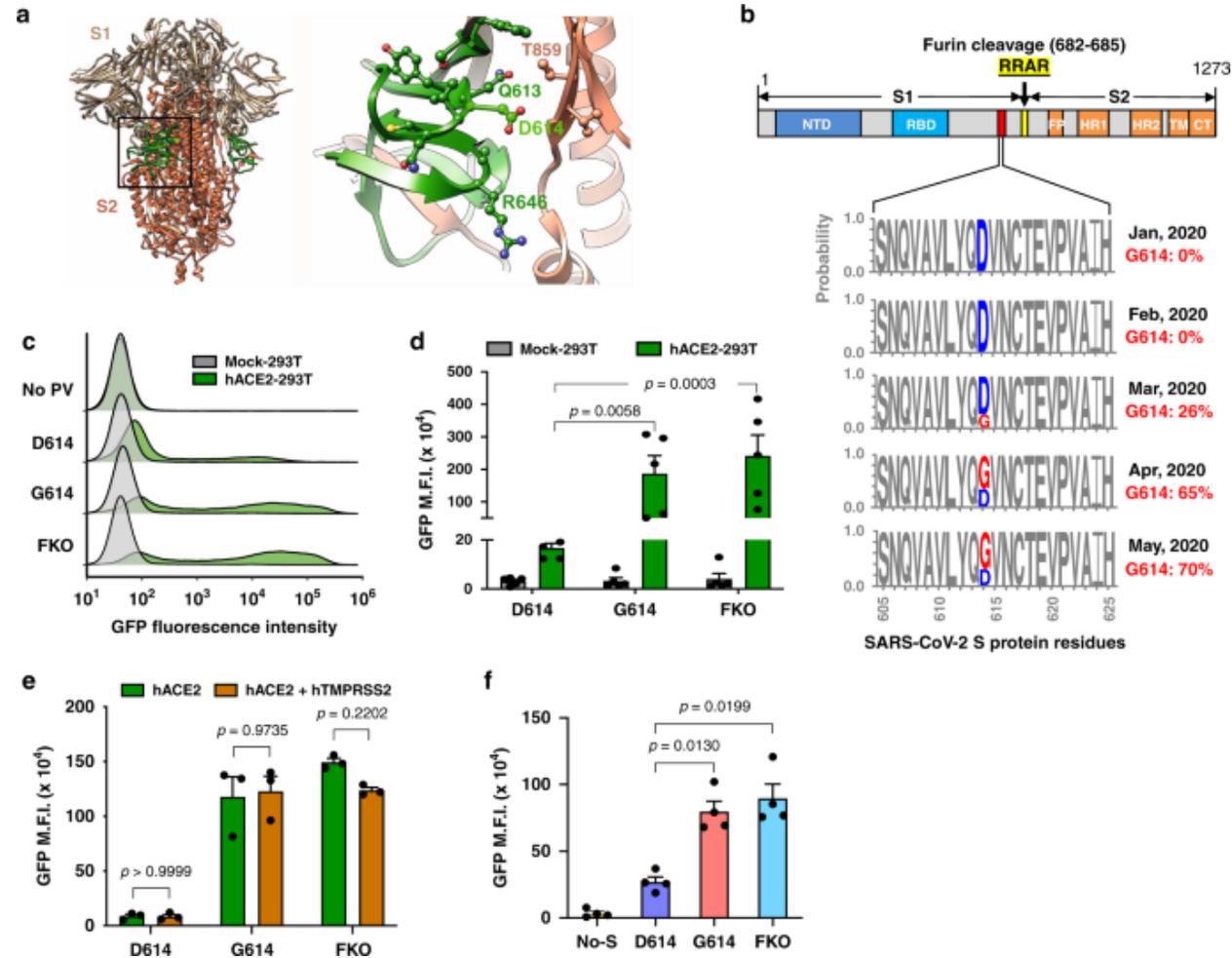


★ The SARS-CoV-2 Structure



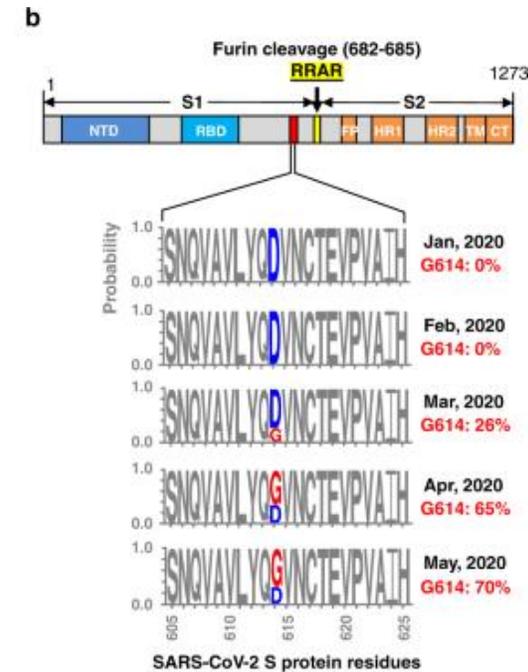
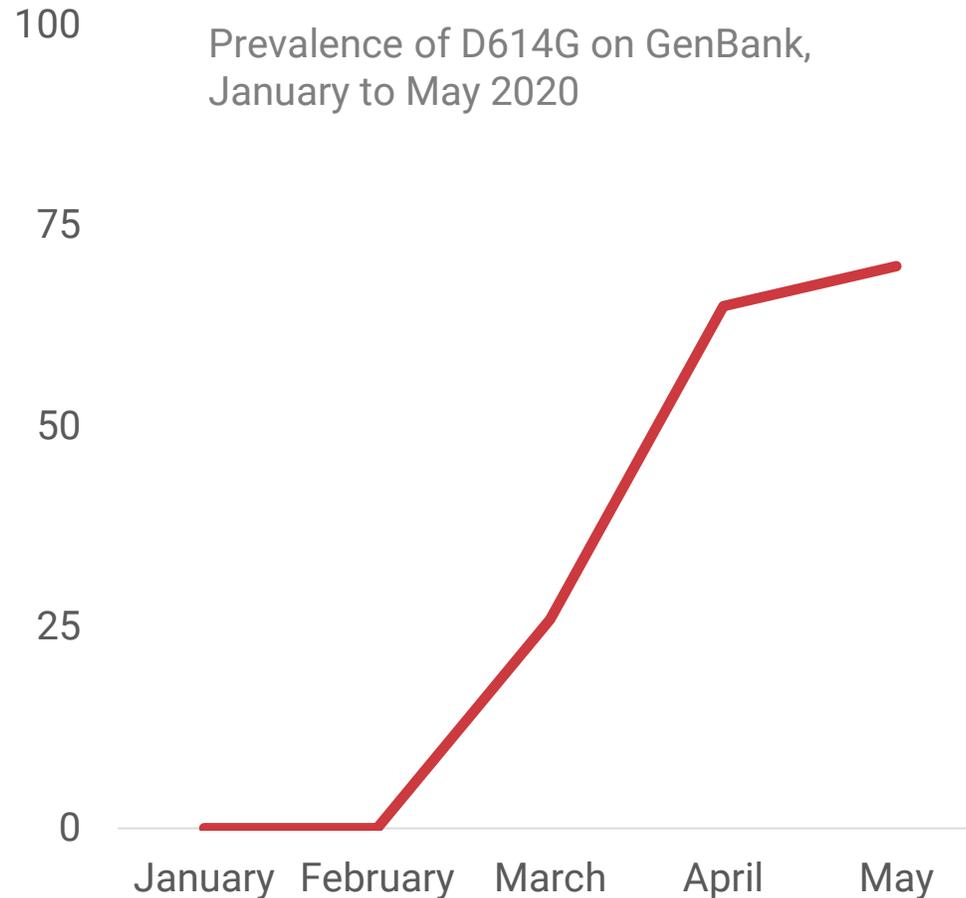
★ Current variants are not the first and won't be the last

D614G

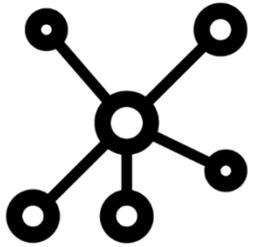


★ Current variants are not the first and won't be the last

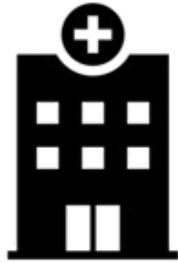
D614G



★ Some variants are concerning or interesting



Increased transmissibility



Increased disease severity



Evades vaccine-induced immunity



Evades infection-induced immunity



Evades therapeutics



Evades diagnostics



Note, some SARS-CoV-2 risk assessment frameworks include zoonotic emergence and transmission from animals to humans, but this is not routine and usually a lower priority than those domains listed above.

★ Some variants are concerning or interesting

PANGOLIN	Lineage			CDC Designation	WHO Designation	Concerns
	Public name	GISAID	Nextstrain			
B.1.1.7	Alpha	GRY (formerly GR/501Y.V1)	20I/S:501Y.V1	Concern	Concern	 
B.1.351	Beta	GH/501Y.V2	20H/S:501Y.V2	Concern	Concern	   
P.1	Gamma	GR/501Y.V3	20J/S:501Y.V3	Concern	Concern	  
B.1.427/B.1.429	Epsilon	GH/452R.V1	20C/S.452R	Concern	Interest	   
B.1.617.2	Delta	G/452R.V3	21A/S:478K	Concern	Concern	  

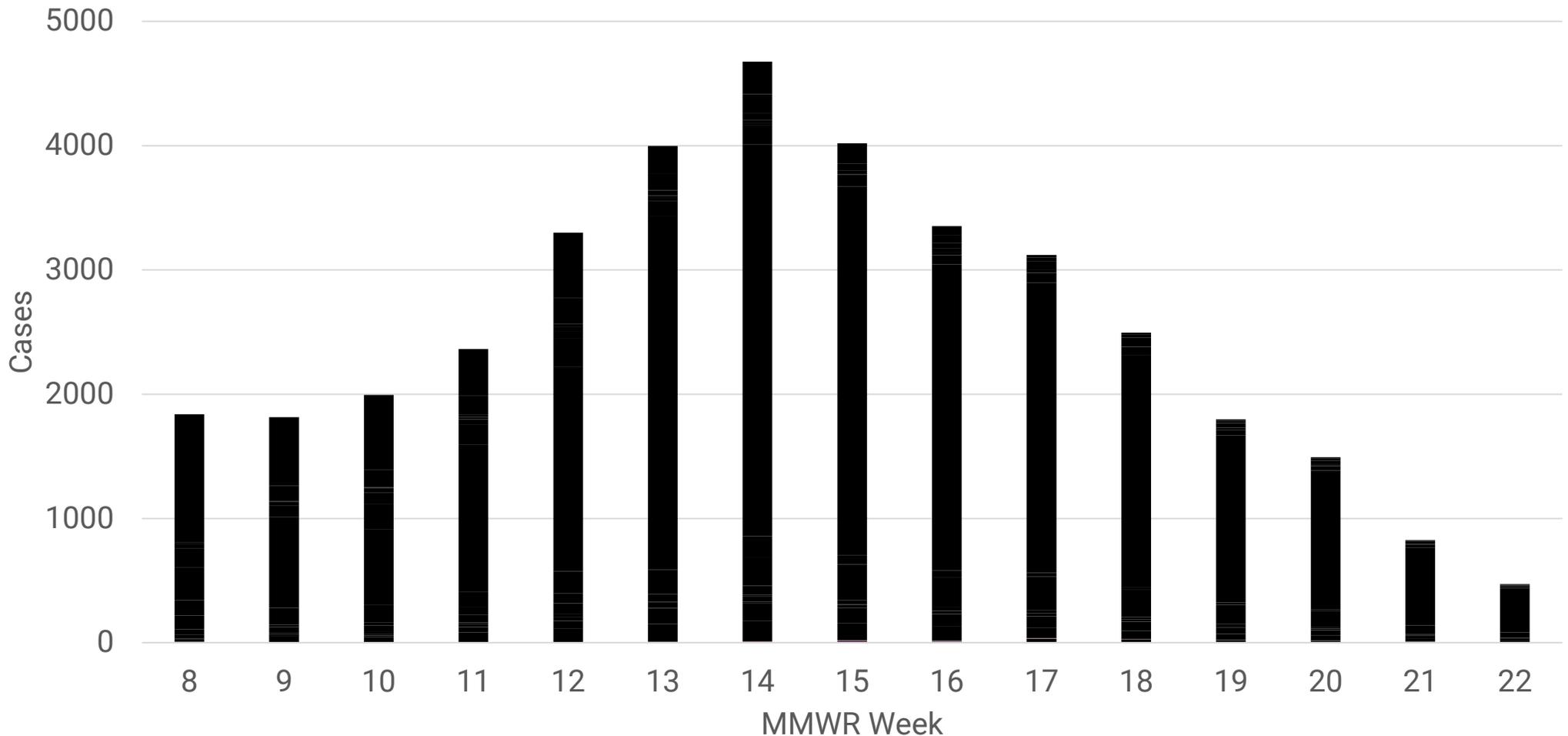
★ Some variants are likely to be ‘of high consequence’

“A variant of high consequence has clear evidence that prevention measures or medical countermeasures have significantly reduced effectiveness relative to previously circulating variants.

Currently there are no SARS-CoV-2 variants that rise to the level of high consequence.”

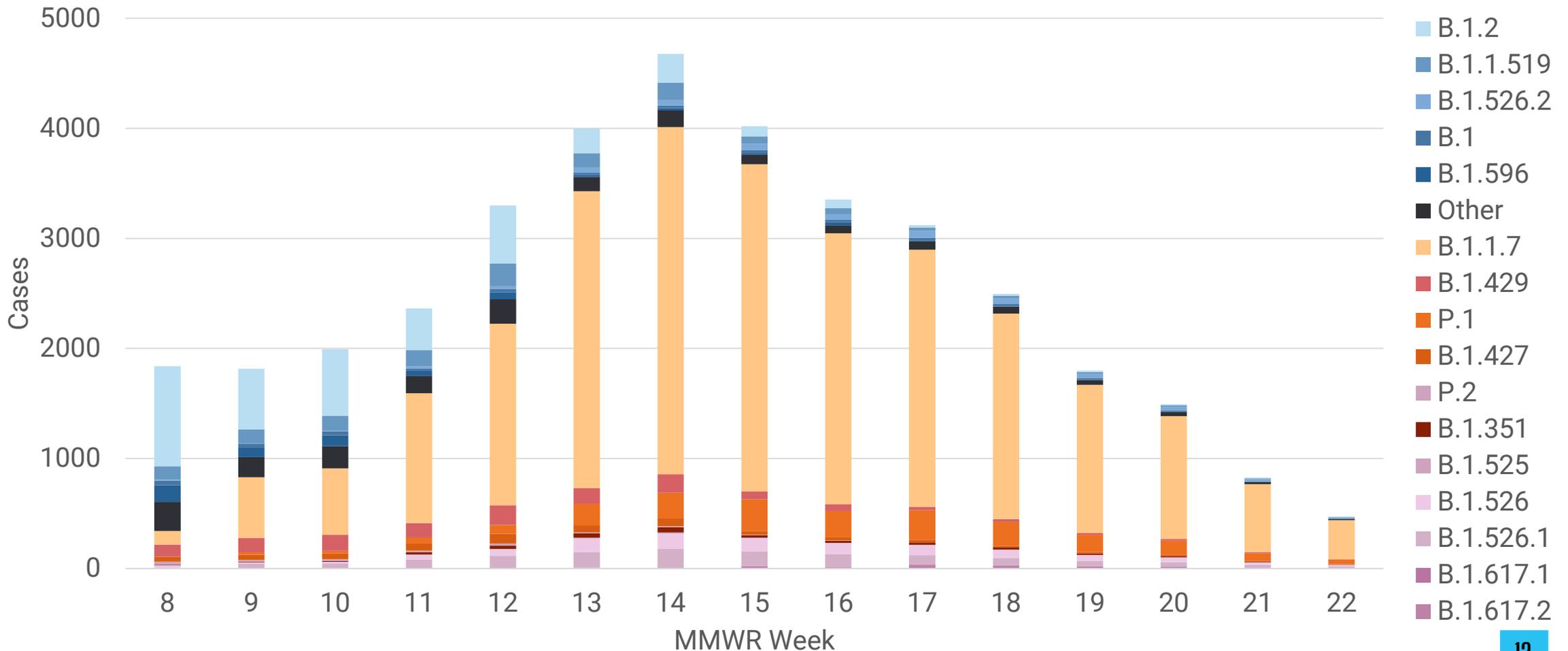


We are seeing a profound reduction in COVID-19 incidence Citywide

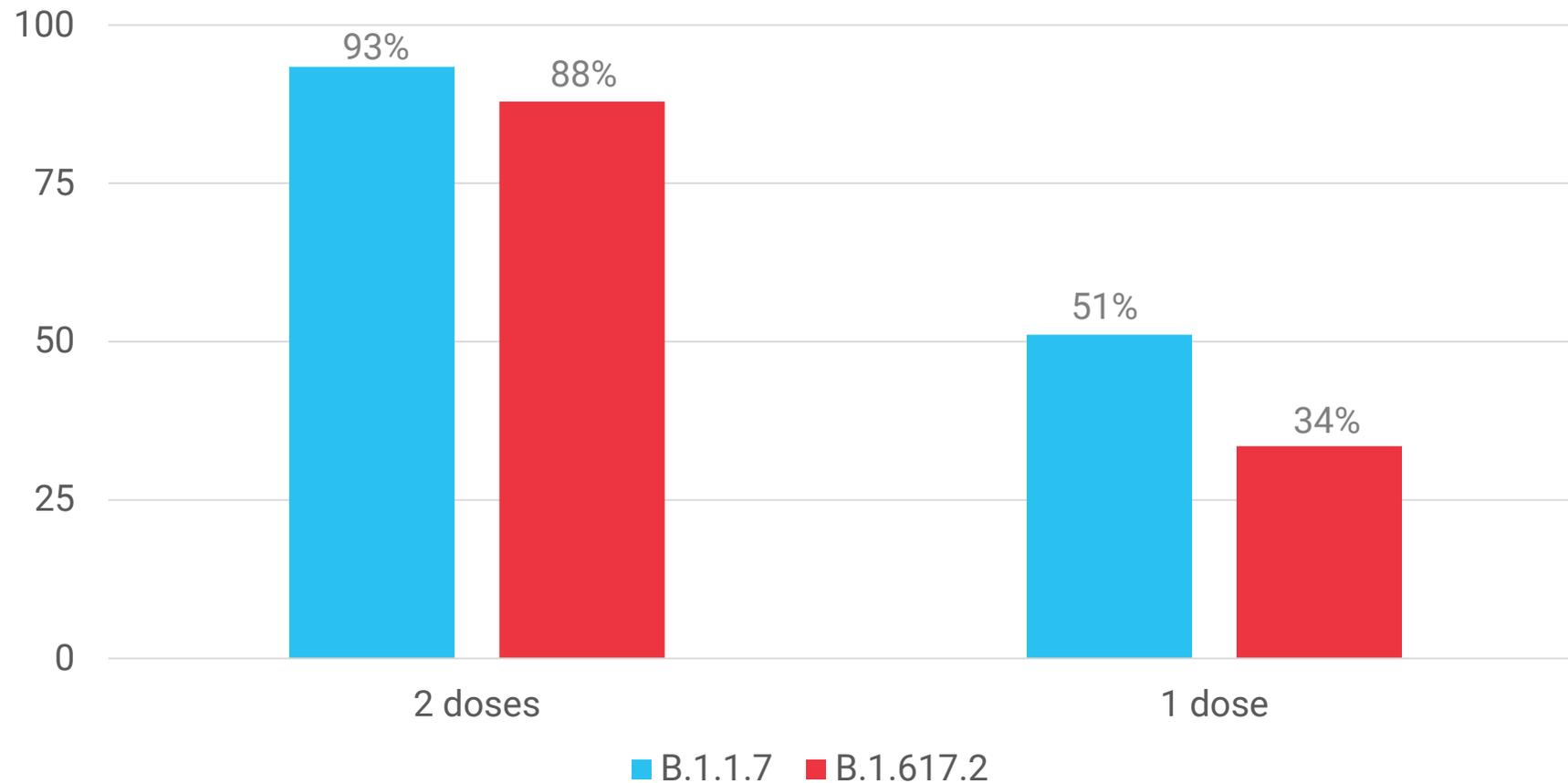




Despite a large increase in the relative proportion of Variants of Concern



★ B.1.617.2 (Delta) – vaccine efficacy (Pfizer)



★ Summary of SARS-CoV-2 variants

- It's complicated!
- It's ever-changing!
 - With time, there will be more data on known variants, and new variants detected
- So far, COVID-19 vaccines protect against all known variants
 - There is a difference in amount of protection across vaccines, variants and number of doses but any dose of any EUA-approved vaccine offers some protection against all known lineages of SARS-CoV-2
- No variants detected so far have been designated a “variant of high consequence”
- CDPH has expertise and is building more
 - Testing and lab-based surveillance team = designated medical director, molecular laboratory director, lab-based surveillance director, epidemiologist, director of planning, research and development
 - If we don't know, we can ask CDC and WHO
- Regional Innovative Public Health Laboratory (RIPHL): healthcare leaders and partners



CDPH's goal is to receive a:

1. Representative sample
2. Submitted routinely
3. With power to detect low frequency lineages
4. And monitor trends.



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Ann & Robert H. Lurie
Children's Hospital of Chicago

RIPHL will be a critical resource for future work in emerging infections, antimicrobial resistance, healthcare associated infections



- Provide a key set of tools that will continue to grow as science and pathogens evolve
 - Strengthen Chicago's capacity to respond to emerging infectious diseases challenges, antimicrobial resistance, healthcare-associated infections
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